

PATENT COOPERATION TREATY

From the INTERNATIONAL BUREAU

PCT

NOTIFICATION OF ELECTION
(PCT Rule 61.2)

Date of mailing (day/month/year) 20 June 2001 (20.06.01)	To: Commissioner US Department of Commerce United States Patent and Trademark Office, PCT 2011 South Clark Place Room CP2/5C24 Arlington, VA 22202 ETATS-UNIS D'AMERIQUE in its capacity as elected Office
International application No. PCT/US00/22106	Applicant's or agent's file reference 7529/2F590-WO
International filing date (day/month/year) 10 August 2000 (10.08.00)	Priority date (day/month/year) 13 August 1999 (13.08.99)
Applicant STEINMAN, Ralph, M.	

1. The designated Office is hereby notified of its election made:

in the demand filed with the International Preliminary Examining Authority on:

12 March 2001 (12.03.01)

in a notice effecting later election filed with the International Bureau on:

2. The election was

was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No.: (41-22) 740.14.35	Authorized officer Nestor Santesso Telephone No.: (41-22) 338.83.38
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PATENT COOPERATION TREATY

PCT

NOTIFICATION OF THE RECORDING
OF A CHANGE(PCT Rule 92bis.1 and
Administrative Instructions, Section 422)

Date of mailing (day/month/year)
13 February 2002 (13.02.02)

Applicant's or agent's file reference
7529/2F590-WO

International application No.
PCT/US00/22106

From the INTERNATIONAL BUREAU

To:

FEHLNER, Paul, F.
Darby & Darby P.C.
805 Third Avenue
New York, NY 10022-7513
ETATS-UNIS D'AMERIQUE

IMPORTANT NOTIFICATION

International filing date (day/month/year)
10 August 2000 (10.08.00)

1. The following indications appeared on record concerning:

the applicant the inventor the agent the common representative

Name and Address	State of Nationality	State of Residence
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2. The International Bureau hereby notifies the applicant that the following change has been recorded concerning:

the person the name the address the nationality the residence

Name and Address	State of Nationality	State of Residence
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3. Further observations, if necessary:

Additional inventor/applicant for US only.

4. A copy of this notification has been sent to:

the receiving Office

the designated Offices concerned

the International Searching Authority

the elected Offices concerned

the International Preliminary Examining Authority

other:

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland	Authorized officer
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Jean-Marie MCADAMS

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(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
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22 February 2001 (22.02.2001)

PCT

(10) International Publication Number
WO 01/12215 A2

(51) International Patent Classification: **A61K 39/00**

(21) International Application Number: **PCT/US00/22106**

(22) International Filing Date: 10 August 2000 (10.08.2000)

(25) Filing Language: English

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60/148,971 13 August 1999 (13.08.1999) US

(71) Applicant (for all designated States except US): **THE ROCKEFELLER UNIVERSITY [US/US]; 1230 York Avenue, New York, NY 10021-6399 (US).**

(72) Inventor; and

(75) Inventor/Applicant (for US only): **STEINMAN, Ralph, M. [US/US]; 62 North Avenue, Westport, CT 06880 (US).**

(74) Agents: **FEHLNER, Paul, F. et al.; Darby & Darby P.C., 805 Third Avenue, New York, NY 10022-7513 (US).**

(81) Designated States (national): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CR, CU, CZ, DE, DK, DM, EE, ES, FI, GB, GD, GE, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW.

(84) Designated States (regional): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW). Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM). European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE). OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

Published:

Without international search report and to be republished upon receipt of that report.

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.



WO 01/12215 A2

(54) Title: **PROTECTIVE ANTIGEN OF EPSTEIN BARR VIRUS**

(57) **Abstract:** The present invention relates to the identification of a subunit vaccine to prevent or treat infection of Epstein Barr Virus. In particular, EBNA-1 was identified as a vaccine antigen. In a specific embodiment, a purified protein corresponding to EBNA-1 elicited a strong CD4⁺ T cell response. The responsive CD4⁺ T cell are primarily T_{H1} in function. EBNA-1 is an attractive candidate for a protective vaccine against EBV, and for immunotherapy of EBV infection and neoplasms, particularly with dendritic cells charged with EBNA-1.

PATENT COOPERATION TRE

HR

From the INTERNATIONAL SEARCHING AUTHORITY

PCT

To: DARBY & DARBY, P.C. DUE: May 14, 2001
 Attn. FEHLNER, Paul F. Docketed on 3/2/01 by BWL for OR THE DECLARATION
 805 Third Avenue
 New York, N.Y. 10022-7511 Docketed without file
 UNITED STATES OF AMERICA Attorney _____

NOTIFICATION OF TRANSMITTAL OF
 THE INTERNATIONAL SEARCH REPORT
 FOR OR THE DECLARATION

(PCT Rule 44.1)

Date of mailing
 (day/month/year)

14/03/2001

Applicant's or agent's file reference
 7529/2F590-W0

FOR FURTHER ACTION See paragraphs 1 and 4 below

International application No.
 PCT/US 00/ 22106

International filing date
 (day/month/year)

10/08/2000

Applicant

THE ROCKEFELLER UNIVERSITY et al.

1. The applicant is hereby notified that the International Search Report has been established and is transmitted herewith.

Filing of amendments and statement under Article 19:

The applicant is entitled, if he so wishes, to amend the claims of the International Application (see Rule 46):

When? The time limit for filing such amendments is normally 2 months from the date of transmittal of the International Search Report; however, for more details, see the notes on the accompanying sheet.

Where? Directly to the International Bureau of WIPO
 34, chemin des Colombettes
 1211 Geneva 20, Switzerland
 Fascimile No.: (41-22) 740.14.35

For more detailed instructions, see the notes on the accompanying sheet.

2. The applicant is hereby notified that no International Search Report will be established and that the declaration under Article 17(2)(a) to that effect is transmitted herewith.

3. With regard to the protest against payment of (an) additional fee(s) under Rule 40.2, the applicant is notified that:

the protest together with the decision thereon has been transmitted to the International Bureau together with the applicant's request to forward the texts of both the protest and the decision thereon to the designated Offices.

no decision has been made yet on the protest; the applicant will be notified as soon as a decision is made.

4. **Further action(s):** The applicant is reminded of the following:

Shortly after **18 months** from the priority date, the international application will be published by the International Bureau. If the applicant wishes to avoid or postpone publication, a notice of withdrawal of the international application, or of the priority claim, must reach the International Bureau as provided in Rules 90bis.1 and 90bis.3, respectively, before the completion of the technical preparations for international publication.

Within **19 months** from the priority date, a demand for international preliminary examination must be filed if the applicant wishes to postpone the entry into the national phase until **30 months** from the priority date (in some Offices even later).

Within **20 months** from the priority date, the applicant must perform the prescribed acts for entry into the national phase before all designated Offices which have not been elected in the demand or in a later election within 19 months from the priority date or could not be elected because they are not bound by Chapter II.

Name and mailing address of the International Searching Authority
 European Patent Office, P.B. 5818 Patentlaan 2
 NL-2280 HV Rijswijk
 Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
 Fax: (+31-70) 340-3016

Authorized officer

Mireille Claudepierre

NOTES TO FORM PCT/ISA/220

These Notes are intended to give the basic instructions concerning the filing of amendments under article 19. The Notes are based on the requirements of the Patent Cooperation Treaty, the Regulations and the Administrative Instructions under that Treaty. In case of discrepancy between these Notes and those requirements, the latter are applicable. For more detailed information, see also the PCT Applicant's Guide, a publication of WIPO.

In these Notes, "Article", "Rule", and "Section" refer to the provisions of the PCT, the PCT Regulations and the PCT Administrative Instructions respectively.

INSTRUCTIONS CONCERNING AMENDMENTS UNDER ARTICLE 19

The applicant has, after having received the international search report, one opportunity to amend the claims of the international application. It should however be emphasized that, since all parts of the international application (claims, description and drawings) may be amended during the international preliminary examination procedure, there is usually no need to file amendments of the claims under Article 19 except where, e.g. the applicant wants the latter to be published for the purposes of provisional protection or has another reason for amending the claims before international publication. Furthermore, it should be emphasized that provisional protection is available in some States only.

What parts of the international application may be amended?

Under Article 19, only the claims may be amended.

During the international phase, the claims may also be amended (or further amended) under Article 34 before the International Preliminary Examining Authority. The description and drawings may only be amended under Article 34 before the International Examining Authority.

Upon entry into the national phase, all parts of the international application may be amended under Article 28 or, where applicable, Article 41.

When?

Within 2 months from the date of transmittal of the international search report or 16 months from the priority date, whichever time limit expires later. It should be noted, however, that the amendments will be considered as having been received on time if they are received by the International Bureau after the expiration of the applicable time limit but before the completion of the technical preparations for international publication (Rule 46.1).

Where not to file the amendments?

The amendments may only be filed with the International Bureau and not with the receiving Office or the International Searching Authority (Rule 46.2).

Where a demand for international preliminary examination has been/ is filed, see below.

How?

Either by cancelling one or more entire claims, by adding one or more new claims or by amending the text of one or more of the claims as filed.

A replacement sheet must be submitted for each sheet of the claims which, on account of an amendment or amendments, differs from the sheet originally filed.

All the claims appearing on a replacement sheet must be numbered in Arabic numerals. Where a claim is cancelled, no renumbering of the other claims is required. In all cases where claims are renumbered, they must be renumbered consecutively (Administrative Instructions, Section 205(b)).

The amendments must be made in the language in which the international application is to be published.

What documents must/may accompany the amendments?

Letter (Section 205(b)):

The amendments must be submitted with a letter.

The letter will not be published with the international application and the amended claims. It should not be confused with the "Statement under Article 19(1)" (see below, under "Statement under Article 19(1)").

The letter must be in English or French, at the choice of the applicant. However, if the language of the international application is English, the letter must be in English; if the language of the international application is French, the letter must be in French.

NOTES TO FORM PCT/ISA/220 (continued)

The letter must indicate the differences between the claims as filed and the claims as amended. It must, in particular, indicate, in connection with each claim appearing in the international application (it being understood that identical indications concerning several claims may be grouped), whether

- (i) the claim is unchanged;
- (ii) the claim is cancelled;
- (iii) the claim is new;
- (iv) the claim replaces one or more claims as filed;
- (v) the claim is the result of the division of a claim as filed.

The following examples illustrate the manner in which amendments must be explained in the accompanying letter:

1. [Where originally there were 48 claims and after amendment of some claims there are 51]:
"Claims 1 to 29, 31, 32, 34, 35, 37 to 48 replaced by amended claims bearing the same numbers; claims 30, 33 and 36 unchanged; new claims 49 to 51 added."
2. [Where originally there were 15 claims and after amendment of all claims there are 11]:
"Claims 1 to 15 replaced by amended claims 1 to 11."
3. [Where originally there were 14 claims and the amendments consist in cancelling some claims and in adding new claims]:
"Claims 1 to 6 and 14 unchanged; claims 7 to 13 cancelled; new claims 15, 16 and 17 added." or
"Claims 7 to 13 cancelled; new claims 15, 16 and 17 added; all other claims unchanged."
4. [Where various kinds of amendments are made]:
"Claims 1-10 unchanged; claims 11 to 13, 18 and 19 cancelled; claims 14, 15 and 16 replaced by amended claim 14; claim 17 subdivided into amended claims 15, 16 and 17; new claims 20 and 21 added."

"Statement under article 19(1)" (Rule 46.4)

The amendments may be accompanied by a statement explaining the amendments and indicating any impact that such amendments might have on the description and the drawings (which cannot be amended under Article 19(1)).

The statement will be published with the international application and the amended claims.

It must be in the language in which the international application is to be published.

It must be brief, not exceeding 500 words if in English or if translated into English.

It should not be confused with and does not replace the letter indicating the differences between the claims as filed and as amended. It must be filed on a separate sheet and must be identified as such by a heading, preferably by using the words "Statement under Article 19(1)."

It may not contain any disparaging comments on the international search report or the relevance of citations contained in that report. Reference to citations, relevant to a given claim, contained in the international search report may be made only in connection with an amendment of that claim.

Consequence if a demand for international preliminary examination has already been filed

If, at the time of filing any amendments under Article 19, a demand for international preliminary examination has already been submitted, the applicant must preferably, at the same time of filing the amendments with the International Bureau, also file a copy of such amendments with the International Preliminary Examining Authority (see Rule 62.2(a), first sentence).

Consequence with regard to translation of the international application for entry into the national phase

The applicant's attention is drawn to the fact that, where upon entry into the national phase, a translation of the claims as amended under Article 19 may have to be furnished to the designated/elected Offices, instead of, or in addition to, the translation of the claims as filed.

For further details on the requirements of each designated/elected Office, see Volume II of the PCT Applicant's Guide.

INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 00/22106

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 C12N15/38 C07K14/05 A61K39/245 A61K48/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 C07K A61K

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ, BIOSIS, EMBASE, MEDLINE

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	<p>THOMSON S A ET AL.: "Targeting a polyepitope protein incorporating multiple class II-restricted viral epitopes to the secretory/endocytic pathway facilitates immune recognition by CD4+ cytotoxic T lymphocytes: a novel approach to vaccine design." <i>JOURNAL OF VIROLOGY</i>, vol. 72, no: 3, March 1998 (1998-03), pages 2246-2252, XP002161615 the whole document</p> <p>---</p> <p>-/-</p>	1-19

Further documents are listed in the continuation of box C.

Patent family members are listed in annex

* Special categories of cited documents:

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

- *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- *X* document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- *Y* document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
- *&* document member of the same patent family

Date of the actual completion of the international search

28 February 2001

Date of mailing of the international search report

14/03/2001

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl.
Fax: (+31-70) 340-3016

Authorized officer

van de Kamp, M

INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 00/22106

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	KHANNA R ET AL.: "Targeting Epstein-Barr virus nuclear antigen 1 (EBNA1) through the class II pathway restores immune recognition by EBNA1-specific cytotoxic T lymphocytes: evidence for HLA-DM-independent processing" INTERNATIONAL IMMUNOLOGY, vol. 9, no. 10, October 1997 (1997-10), pages 1537-1543, XP000982330 abstract page 158, right-hand column, line 16-31 ---	1-4, 10, 11, 16, 17
X	MURRAY R J ET AL.: "Identification of target antigens for the human cytotoxic T cell response to Epstein-Barr virus (EBV): implications for the immune control of EBV-positive malignancies." JOURNAL OF EXPERIMENTAL MEDICINE, vol. 176, no. 1, 1 July 1992 (1992-07-01), pages 157-168, XP000982581 cited in the application abstract	5, 7-9
A	WO 96 02563 A (CORNELL RES FOUNDATION INC) 1 February 1996 (1996-02-01) examples 3, 13, 14, 22 ---	2, 3
A	WO 97 24447 A (VIAGENE INC) 10 July 1997 (1997-07-10) page 2, line 5-21 page 3, line 16-21 page 4, line 11-15 page 17, line 15, 19 page 19, line 23 -page 20, line 24 claims 1, 2, 5, 6, 9, 10 ---	6, 11, 13-15
A	DI NICOLA M ET AL.: "Gene transfer into human dendritic antigen-presenting cells by vaccinia virus and adenovirus vectors." CANCER GENE THERAPY, vol. 5, no. 6, November 1998 (1998-11), pages 350-356, XP000982578 abstract	6, 14, 15
A	CA 2 180 193 A (UNIV MANITOBA ;MANITOBA CANCER TREATMENT (CA)) 29 December 1996 (1996-12-29) page 3, line 3-15 page 6, line 12-18 page 11, line 11 -page 12, line 33 page 14, line 1-24 examples 1, 3-5 ---	11, 13
		-/-

INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 00/22106

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of the relevant passages	Relevant to claim No
A	KHANNA R ET AL.: "Vaccine strategies against Epstein-Barr virus-associated diseases: lessons from studies on cytotoxic T-cell-mediated immune regulation" IMMUNOLOGICAL REVIEWS, vol. 170, August 1999 (1999-08), pages 49-64, XP000982313 the whole document page 51, right-hand column, line 28-47 ---	1-19
A	TARTE K ET AL.: "Dendritic cell-based vaccine: a promising approach for cancer immunotherapy" LEUKEMIA, vol. 13, no. 5, May 1999 (1999-05), pages 653-663, XP000982618 abstract table 2 ---	6,14,15
T	MÜNZ C ET AL.: "Human CD4(+) T lymphocytes consistently respond to the latent Epstein-Barr virus nuclear antigen EBNA1." JOURNAL OF EXPERIMENTAL MEDICINE, vol. 191, no. 10, 15 May 2000 (2000-05-15), pages 1649-1660, XP000982334 the whole document ---	1-19
T	BICKHAM K ET AL.: "EBNA1-specific CD4+ T cells in healthy carriers of Epstein-Barr virus are primarily Th1 in function." JOURNAL OF CLINICAL INVESTIGATION, vol. 107, no. 1, January 2001 (2001-01), pages 121-130, XP002161443 the whole document -----	1-19

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 00/22106

Patent document cited in search report	Publication date	Patent family member(s)		Publication date
WO 9602563 A	01-02-1996	EP	0770090 A	02-05-1997
WO 9724447 A	10-07-1997	EP	0871747 A	21-10-1998
CA 2180193 A	29-12-1996	NONE		